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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/766,207

01/29/2004

Walter Schwarzenbach

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03/10/2006

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EXAMINER

DUONG, KHANH B

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 03/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/766,207	SCHWARZENBACH ET AL.	
	Examiner	Art Unit	
	Khanh B. Duong	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4 and 7-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4 and 7-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/29/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

This office action is in response to the amendment filed December 13, 2005.

Accordingly, claims 1, 3, 4, 7 and 9 were amended, claims 2, 5 and 6 were canceled, and new claims 18 and 19 were added.

Currently, claims 1, 3, 4 and 7-19 are pending.

Response to Arguments

Applicant's arguments with respect to the amended claims have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

The indicated allowability of claims 9 and 10 is withdrawn in view of Yoo (US 6,911,376), previously cited. Rejections based on Yoo, Ohmi and Aspar follow.

Claim Objections

Claims 1, 9, 18 and 19 are objected to because of the following informalities:

Claim 1: line 3, after "creating", "an" should be --a--.

Claim 9: line 3, after "creating", "an" should be --a--; line 7, before "such", "applying heat to the" is incomplete and should be --applying heat to the weakened zone--.

Claim 18: lines 3-4, "compared to a conventional detachment annealing on a wafer having a weakened zone but not a super-weakened region" is informal as it does NOT positively recite the process.

Claim 19: line 6, before "such", "applying heat to the" is incomplete and should be --applying heat to the weakened zone--; and lines 9-11, "compared to a conventional detachment

annealing on a wafer having a weakened zone but not a super-weakened region” is informal as it does NOT positively recite the process.

Appropriate correction is required.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the steps as recited in Claim 1 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

§ 1.83 Content of drawing:

(a) The drawing in a nonprovisional application must show every feature of the invention specified in the claims. However, conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation (*e.g.*, a labeled rectangular box). In addition, tables and sequence listings that are included in the specification are, except for applications filed under 35 U.S.C. 371, not permitted to be included in the drawings.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the

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drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 18 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 18, line 2, "low surface" and "improved homogeneity" are indefinite in scope and meaning as to what is considered as "low" or "improved".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3, 4, 7-9, 11, 12 and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi et al. (US Patent No. 6,597,039) in view of Yoo (US 6,911,376).

Ohmi et al. ("Ohmi") discloses in 6A-6C a method of detaching a layer 37 from a wafer 1, which comprises: creating an weakened zone ("separation area") 3 in a wafer 1 to define the layer 37 to be detached and a remainder portion 38 of the wafer 1, such that the weakened zone 3 includes a main region 31 and a localized super-weakened region 32 that is more weakened than the main region 31; and initiating detachment of the layer 37 from the remainder portion 38 at the super-weakened region 32 by applying a controlled detachment force (heating or external force) to at least the weakened zone 3 such that the detachment initiates and propagates from the super-weakened region 32 through the main region 31 to detach the layer 37 from the remainder portion 38 [see col. 10, lines 18-38].

Re claim 1, Ohmi discloses applying a thermal treatment (heating) at least to the weakened zone 3 of the wafer 1 to initiate detachment of layer 37 from the remainder portion 38 [see col. 10, lines 21-26]. However, Ohmi does not specifically mention the thermal treatment as being controlled for evening the heating applied to the weakened zone 3.

Yoo expressly teaches in FIGs. 2C, 2D, 4A and 5B the use of flash annealing treatment 214 to initiate detachment of a layer 402 from a remainder portion 400, wherein the heating elements, (lamps 508) of the flash annealing treatment are “independently controlled” for evening the application of heat (temperature) to the weakened zone for the purpose of providing “a uniform temperature distribution across the surface of surface 218 of support substrate 202, which heats the ion implantation 206”. In addition, each lamp 508 is “independently controlled” by a function of the relationship between the power supplied to lamp 508 and the length of time which the radiation energy is allowed to impinge on surface 218 of support substrate 202 [see at least col. 6, lines 11-38].

Since Ohmi and Yoo are from the same field of endeavor, the purpose disclosed by Yoo would have been recognized in the pertinent prior art of Ohmi.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the flash annealing treatment of Yoo into the delamination process of Ohmi, since Yoo states at column 6, lines 41-46 that such annealing treatment would “substantially heats only the ion implantation 206 to the desired temperature, thus protecting the remaining silicon substrate 200 from experiencing thermal expansion before separation of the substrates 200 and 202”.

Re claim 3, Ohmi expressly discloses in FIG. 6A the detachment force 111 is applied to both the super-weakened region 32 and the main region 31.

Re claim 4, Ohmi expressly discloses in FIG. 6A the detachment force is obtained by applying energy to the weakened zone 3.

Re claim 7, see discussion above regarding claim 1.

Re claim 8, Ohmi discloses the heating of the weakened zone comprises thermally annealing the wafer [see col. 10, lines 21-23].

Re claim 9, see discussion above regarding claim 1.

Re claim 11, Ohmi discloses in FIG. 1C the weakened zone 3 is created by implanting a dose of atomic species in the wafer [see col. 10, lines 4-11].

Re claim 12, Ohmi discloses the super-weakened region 32 is created by implanting an overdose of the atomic species compared to the dose of atomic species implanted in the main region 31 [see col. 10, lines 13-17].

Re claim 14, Ohmi discloses an initial dose of atomic species is applied to the weakened zone, and the overdose is applied to the super-weakened region after the application of the initial dose [see col. 10, lines 4-11].

Re claim 15, Ohmi discloses the weakened zone 3 is created by producing a porous layer in the wafer 1 [see col. 6, lines 24-35].

Re claim 16, Ohmi expressly discloses in FIGs. 1A-1C the weakened zone 3 extends through a crystalline layer of the wafer 1.

Re claim 17, Ohmi discloses the wafer 1 comprises a semiconductor material [see col. 6, lines 37-39].

Re claim 18, as previously discussed above, the combined teaching of Ohmi and Yoo discloses providing a uniform temperature distribution to heat the weakened zone, it is inherent that the detached layer is substantially homogenous and comprises a “low” surface roughness and “improved” homogeneity.

Re claim 19, see discussions above regarding claims 1 and 18.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi and Yoo as applied to claims 1, 3, 4, 7-9, 11, 12 and 14-19 above, and further in view of Aspar et al. (U.S. 2003/0234075 A1).

Re claim 13, Ohmi and Yoo fail to disclose the atomic species is applied in substantially a single operation to both the super-weakened and main regions.

Aspar et al. ("Aspar") suggests in FIG. 1C the atomic species is applied in substantially a single operation to both the super-weakened region 36 and main region 12. [see page 3, paragraph [0054]].

Since Ohmi, Yoo and Aspar are from the same field of endeavor, the purpose disclosed by Aspar would have been recognized in the pertinent prior art of Ohmi and Yoo.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined method disclosed by Ohmi and Yoo as suggested by Aspar because of the desirability to minimize process steps.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh B. Duong whose telephone number is (571) 272-1836. The examiner can normally be reached on 10:00-6:30.

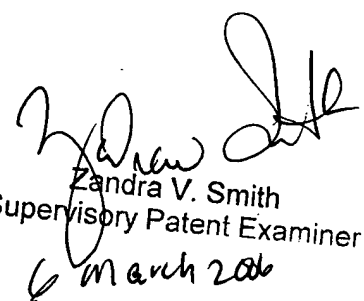
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



KBD



Zandra V. Smith
Supervisory Patent Examiner
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